

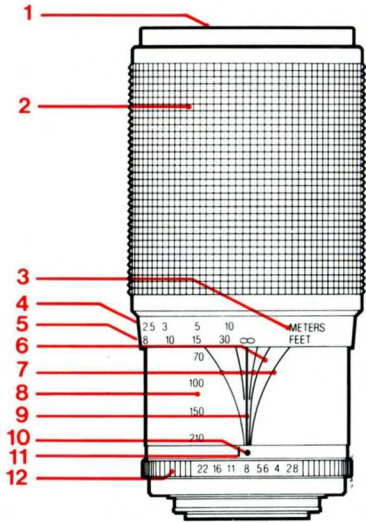
# Vivitar Series

# 1

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70-210mm f2.8-f4.0

Macro 1:2.5x



# Controls and Components

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1. Accessory Thread
2. Zoom/Focus Ring
3. Distance Scales
4. Macro Range Position and Index
5. Reproduction Ratio Scale
6. Infrared Index Line
7. Depth of Field Curves
8. Focal Length Scale
9. Distance Index Line
10. Aperture Index Dot
11. Variable Aperture Indicator
12. Aperture Ring

## Mounting the Lens

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Your Vivitar zoom lens will mount on your camera in the same manner as your normal lens. While mounting your lens, leave the front lens cap on to avoid smudging the front element. For easier handling, slide the Zoom/Focus Ring forward and grasp the lens around the barrel; engage and lock as you would your normal lens.

## Holding the Lens

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For best balance during use, support the lens/camera combination with your left hand under the lens. This leaves your right hand free to operate the camera controls.

## Setting the Aperture

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This lens has an automatic diaphragm which lets you focus your picture with the diaphragm wide open at maximum aperture. At the moment of shutter release, the diaphragm will automatically stop down to the aperture pre-selected manually or determined by the camera's metering and exposure control system.

**NOTE:** Certain model lenses have an auto/manual selector which must be set at the auto position for automatic diaphragm control. In the manual position, the f-stop is selected by rotating the Aperture Ring.

## Variable Aperture Lens

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This is a variable aperture lens. This means that the *effective* aperture changes from the *set* aperture as the lens is zoomed from the shortest focal length to the longest focal length. For correct metering, the aperture is *always* set at the red Aperture Index Dot. At the shortest focal length the aperture range is f2.8 — f22. The shortest focal length is color-coded in red and corresponds to the aperture set at the red index dot. At the longest focal length the effective aperture range is f4.0 — f32. The effective aperture is shown by the green Variable Aperture Indicator. The longest focal length is color-coded in green and corresponds to the effective aperture indicator readout.

If you are using a camera equipped with automatic shutter control, automatic aperture control, or both, your camera will automatically compensate for the variable aperture. If you are using the manual mode on cameras so equipped, follow metering procedures as outlined in your SLR manual, remembering that changes in focal length may require manual adjustments in shutter speed or aperture.

For further information on variable aperture:

In the U.S., write to Consumer Affairs, Vivitar Corporation, P.O. Box 2100, Santa Monica, CA 90406.

In other countries, contact your nearest Vivitar subsidiary as listed in the International Service Centers folder.

## Lenses for Shutter Priority Cameras

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Many of today's cameras have metering systems designed to automatically adjust the lens aperture. Your Vivitar zoom lens is fully compatible with these systems.

**Canon:** Canon mount lenses have a click stop at the green "O" for shutter priority operation. The Aperture Ring may be set and removed from this position in the same manner as your normal lens.

**Konica:** Konica mount lenses have an Aperture Ring that locks with a positive "click" when placed in the green "AE" position. To remove from AE operation, press the AE lock button and turn the Aperture Ring to the specific f-stop you want.

**Minolta:** On Minolta mount lenses, the minimum aperture setting is engraved in green. When using this lens in shutter priority mode on correspondingly equipped cameras, the lens must be set at this minimum aperture position.

## Focusing and Zooming

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Vivitar's "one-touch" design lets you focus and compose your picture quickly and easily. Focusing and zooming are both controlled by the single Zoom/Focus Ring.

1. To focus in normal, non-macro operation, turn the Zoom/Focus Ring until the subject appears sharpest in the camera viewfinder.

2. To zoom from one focal length to another, slide the Zoom/Focus Ring along the lens barrel to the desired position. The Focal Length Scale shows the most common focal lengths. This zooming capability gives you excellent creative control over the composition of your photo, since you can crop out unwanted background from around your key subject by increasing the focal length.
3. Since zooming may cause you to inadvertently turn the ring slightly, it is recommended that you re-check the focus for sharpness at the desired focal length.
4. All lenses under extremely cold conditions experience a shift in focus. When operating under these conditions, you may observe that the lens will come into focus just prior to reaching the infinity mark and stop position. This is a normal condition.

## **Distance to Subject**

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Once focused, you can determine the approximate distance between camera and subject, if desired, (useful in flash and infrared photography) by finding the point on the feet or meter Distance Scale intersected by the Distance Index Line.

## **Infrared Index Line**

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Since infrared light focuses at a different point from visible light, your lens has an Infrared Index Line engraved on the barrel for use with black and white infrared

film. When using B&W infrared film, focus normally on your subject, select the zoom position you prefer and find the distance to subject as explained above.

Without changing the zoom position, turn the Zoom/Focus Ring to the right until this distance to subject intersects the Infrared Index Line. Your lens will then be focused for average infrared photography. Note: Infrared radiation is variable by nature and therefore this setting can only be an approximation and may not be sharp in every situation.

## **Depth of Field**

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Depth of field is the area of acceptable sharpness in front of and behind the subject in focus. This depth is determined by three factors: the lens aperture, the focal length, and the distance to subject. Increasing aperture size and/or focal length reduces the depth of field around a given subject. Decreasing aperture and/or focal length has the opposite effect.

In contrast, depth of field increases as distance to subject increases and vice versa.

This variability of the depth of field offers you creative possibilities—by opening the lens to wider apertures you can blur out unwanted backgrounds and foregrounds, something which is particularly pleasing in portrait and still-life photography.

Tables for determining precise depth of field at selected focal length/aperture combinations are presented at the end of this manual.



## Macro Mode Operation

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Your Vivitar Series 1 70-210 f/2.8-4.0 lens has been constructed with a unique internal cam system. When you focus from  $\infty$  toward the close focus position at the 70mm setting, as you pass 5.2 ft (1.6 m) on the focusing scale the lens automatically cams to the 100mm setting and allows for focusing down to 4.3 ft (1.3 m). When you reach the "M•R" setting, you can zoom between the 100mm and 210mm settings and vary the reproduction ratios from 1:11 to 1:2.5. This feature provides a wide range of photographic possibilities.

To set your lens for macro operation:

1. Align the "M•R" at the beginning of the Distance Scales on the Zoom/Focus Ring with the Distance Index Line.
2. Move your camera and lens toward the subject until the image comes into sharp focus. You'll then be able to continuously change your reproduction ratio by sliding the Zoom/Focus Ring from one zoom setting to another. There is no need to refocus.

**NOTE:** "Reproduction Ratio" refers to the relationship between the actual size of your subject and the size of its image on the film. For example, a reproduction ratio of 1:4 means that the size of the image on the film is 1/4 lifesize. A ratio of 1:2 means the size of the image is 1/2 lifesize.

## Helpful Hints in Macro Operation

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1. Because exposure in macro photography is critical to getting the best possible picture, it's a good idea to shoot several pictures of the same subject, varying the exposure slightly. This method involves shooting the pictures at the f-stop indicated by your TTL metering system, underexposing by 1/2 to 1 f-stop and overexposing 1/2 to 1 f-stop. (Your particular camera may require use of the exposure compensation control.) The results will be well worth the few cents it may add to your film cost.
2. Always try to use a tripod or other stable support when shooting at higher reproduction ratios to assure that no slight movements occur to degrade picture quality. If a stable support is unavailable or impossible to use, take the photo at the fastest shutter speed that lighting conditions will allow.
3. It is always a good idea to use a cable release to trigger the shutter of your camera. Even the slightest movement caused by your finger depressing the shutter release can affect the quality of macro photos at high reproduction ratios. If your camera has a self-timer, you can use it to prevent this movement if a cable release is not available.
4. When shooting pictures in macro mode, the depth of field is diminished. It is therefore recommended you use the smallest f-stop possible.

## Lens Care

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1. It is a good idea to keep a Skylight 1A or UV filter on your lens at all times. This not only improves photographs, but also protects the front lens element from dirt and scratches.
2. Keep your lens dust free by making sure both front and rear lens caps are in place when it's not in use.
3. Clean your lens with an air brush, anti-static brush or wipe it lightly with a camel-hair brush or lens tissue with lens cleaning fluid. In **extreme** cases, use a clean, soft cotton cloth moistened with medical alcohol. Never rub the lens surface with your finger, clothing or any other possibly abrasive material. This will scratch the lens coating and cause damage to the element surface.
4. Always store your lens in a cool, dry place. It's a good idea to store it with the silica gel packet supplied, especially during wet or humid weather.

## Specifications

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**Focal Length:** 70-210mm

**Aperture Range:** f/2.8-4.0

**Optical Construction:** 14 elements in 10 groups, multicoated

**Angle of Acceptance:** 34°-12°

**Minimum Focusing Distance from Film Plane:**

5.2 ft (1.6 m) at 70mm

2.6 ft (0.8 m) at 210mm

**Maximum Reproduction Ratio:** 1:2.5

**Filter Size:** 62mm

**Maximum Barrel Diameter:** 2.76 in. (70 mm)

**Length at Infinity:** 5.5 in. (139 mm)

**Weight:** 30.3 oz. (860 g)

Specifications subject to change without notice. Length and weight may vary slightly depending on lens mount.

## Depth of field tables

**f = 70.00**

ft	28	40	56	80	110	160	220
6	5 86-6 15	5 80-6 22	5 72-6 31	5 61-6 45	5 48-6 63	5 28-6 97	5 05-7 42
8	7 75-8 27	7 64-8 40	7 51-8 56	7 32-8 83	7 09-9 19	6 74-9 86	6 37-10 81
10	9 60-10 43	9 44-10 63	9 23-10 91	8 94-11 35	8 60-11 96	8 09-13 14	7 55-14 91
15	14 11-16 02	13 76-16 49	13 32-17 18	12 71-18 33	12 02-19 99	11 03-23 58	10 04-30 09
30	26 58-34 43	25 35-36 77	23 87-40 42	21 95-47 51	19 96-60 89	17 33-115	14 98-∞
∞	230-∞	161-∞	115-∞	80 4-∞	58 5-∞	40 2-∞	29 2-∞

**f = 70.00**

m	28	40	56	80	110	160	220
1.7	1 66-1 74	1 65-1 76	1 63-1 78	1 60-1 82	1 56-1 86	1 51-1 95	1 45-2 07
2	1 95-2 06	1 93-2 08	1 90-2 11	1 86-2 17	1 81-2 23	1 74-2 36	1 66-2 53
2.5	2 42-2 59	2 39-2 63	2 34-2 68	2 28-2 77	2 21-2 88	2 10-3 10	1 98-3 41
3	2 88-3 13	2 84-3 19	2 77-3 27	2 69-3 40	2 59-3 58	2 43-3 92	2 28-4 44
5	4 68-5 37	4 55-5 55	4 39-5 81	4 17-6 24	3 93-6 89	3 59-8 32	3 24-11 1
10	8 77-11 64	8 33-12 52	7 81-13 93	7 14-16 77	6 45-22 5	5 55-52 5	4 77-∞
∞	70 0-∞	49 0-∞	35 0-∞	24 5-∞	17 8-∞	12 3-∞	8 91-∞

**f = 100.00**

ft	31	40	56	80	110	160	220
5	4.95-5.05	4.93-5.07	4.91-5.10	4.87-5.14	4.82-5.19	4.75-5.28	4.66-5.40
6	5.93-6.08	5.90-6.10	5.87-6.14	5.81-6.20	5.74-6.28	5.63-6.42	5.51-6.60
8	7.86-8.14	7.83-8.18	7.76-8.26	7.66-8.38	7.54-8.53	7.34-8.79	7.13-9.13
10	9.78-10.23	9.72-10.29	9.62-10.42	9.46-10.61	9.28-10.85	8.98-11.29	8.65-11.87
15	14.51-15.53	14.37-15.69	14.14-15.98	13.80-16.44	13.39-17.06	12.77-18.20	12.10-19.79
30	28.06-32.24	27.54-32.95	26.67-34.30	25.46-36.55	24.09-39.82	22.12-46.82	20.14-59.37
$\infty$	423- $\infty$	328- $\infty$	234- $\infty$	164- $\infty$	119- $\infty$	82.0- $\infty$	59.65- $\infty$

**f = 100.00**

m	31	40	56	80	110	160	220
1.5	1.49-1.52	1.48-1.52	1.47-1.53	1.46-1.54	1.45-1.56	1.43-1.58	1.40-1.62
1.7	1.68-1.72	1.68-1.73	1.67-1.74	1.65-1.75	1.63-1.77	1.60-1.81	1.57-1.85
2	1.97-2.03	1.97-2.04	1.95-2.05	1.93-2.08	1.91-2.11	1.87-2.16	1.82-2.22
2.5	2.46-2.55	2.44-2.56	2.42-2.58	2.39-2.62	2.35-2.67	2.29-2.76	2.22-2.87
3	2.94-3.07	2.92-3.09	2.89-3.12	2.84-3.18	2.79-3.25	2.70-3.38	2.60-3.55
5	4.82-5.19	4.77-5.25	4.69-5.36	4.56-5.53	4.42-5.76	4.20-6.20	3.96-6.81
10	9.30-10.82	9.11-11.09	8.80-11.59	8.36-12.44	7.88-13.70	7.19-16.49	6.51-21.83
$\infty$	129- $\infty$	100- $\infty$	71.4- $\infty$	50.0- $\infty$	36.4- $\infty$	25.0- $\infty$	18.2- $\infty$

**f = 150.00**

ft	36	40	56	80	110	160	220
2.75	2.744-2.756	2.743-2.757	2.740-2.760	2.736-2.764	2.731-2.769	2.723-2.778	2.713-2.789
3	2.992-3.008	2.992-3.009	2.988-3.012	2.983-3.017	2.977-3.024	2.966-3.035	2.954-3.048
3.5	3.489-3.511	3.488-3.512	3.483-3.517	3.476-3.525	3.467-3.534	3.452-3.550	3.434-3.569
4	3.985-4.015	3.983-4.017	3.977-4.023	3.967-4.034	3.955-4.046	3.935-4.068	3.911-4.094
4.5	4.481-4.520	4.478-4.522	4.470-4.531	4.457-4.544	4.441-4.561	4.415-4.589	4.384-4.623
5	4.975-5.025	4.973-5.028	4.962-5.039	4.946-5.056	4.926-5.077	4.893-5.113	4.854-5.157
6	5.963-6.037	5.959-6.041	5.943-6.058	5.919-6.083	5.889-6.115	5.840-6.169	5.783-6.236
8	7.932-8.069	7.924-8.077	7.895-8.108	7.850-8.156	7.796-8.216	7.707-8.318	7.602-8.445
10	9.89-10.11	9.88-10.12	9.83-10.18	9.76-10.25	9.68-10.35	9.53-10.52	9.37-10.73
15	14.75-15.26	14.72-15.29	14.61-15.41	14.45-15.59	14.26-15.83	13.94-16.24	13.59-16.76
30	28.98-31.10	28.87-31.23	28.44-31.75	27.82-32.56	27.08-33.64	25.93-35.62	24.68-38.32
∞	820-∞	738-∞	527-∞	369-∞	268-∞	185-∞	134-∞

**f = 150.00**

m	36	40	56	80	110	160	220
0.8	0.798-0.802	0.798-0.802	0.797-0.803	0.796-0.804	0.795-0.805	0.793-0.808	0.790-0.810
0.9	0.898-0.902	0.898-0.903	0.897-0.904	0.895-0.905	0.893-0.907	0.890-0.910	0.886-0.914
1	0.997-1.003	0.997-1.003	0.996-1.005	0.994-1.006	0.991-1.009	0.987-1.013	0.983-1.018
1.1	1.096-1.104	1.096-1.104	1.094-1.106	1.092-1.108	1.089-1.111	1.084-1.116	1.078-1.123
1.2	1.196-1.204	1.195-1.205	1.193-1.207	1.190-1.210	1.187-1.214	1.181-1.220	1.174-1.228
1.3	1.295-1.305	1.294-1.306	1.292-1.308	1.288-1.312	1.284-1.316	1.277-1.324	1.269-1.333
1.5	1.493-1.507	1.492-1.508	1.489-1.511	1.484-1.516	1.478-1.523	1.468-1.533	1.457-1.546
1.7	1.690-1.710	1.689-1.711	1.685-1.715	1.679-1.722	1.671-1.730	1.658-1.744	1.643-1.761
2	1.986-2.014	1.985-2.015	1.979-2.022	1.970-2.031	1.959-2.043	1.941-2.063	1.920-2.088
2.5	2.478-2.522	2.476-2.525	2.466-2.535	2.452-2.550	2.434-2.569	2.406-2.602	2.372-2.643
3	2.968-3.033	2.964-3.037	2.950-3.051	2.930-3.074	2.904-3.103	2.863-3.152	2.814-3.213
5	4.908-5.096	4.898-5.107	4.858-5.151	4.800-5.219	4.729-5.306	4.615-5.458	4.486-5.652
10	9.63-10.40	9.59-10.45	9.43-10.64	9.21-10.95	8.94-11.35	8.53-12.09	8.09-13.12
∞	250-∞	225-∞	161-∞	113-∞	81.8-∞	56.3-∞	40.9-∞

**f = 210.00**

ft	40	5.6	8.0	11.0	16.0	22.0	32.0
2.75	2.747-2.753	2.746-2.754	2.744-2.756	2.742-2.758	2.738-2.762	2.734-2.766	2.727-2.774
3	2.996-3.004	2.995-3.005	2.993-3.007	2.990-3.010	2.985-3.015	2.980-3.020	2.971-3.030
3.5	3.495-3.505	3.492-3.508	3.489-3.511	3.485-3.515	3.478-3.522	3.470-3.530	3.457-3.544
4	3.992-4.008	3.989-4.011	3.985-4.015	3.979-4.021	3.970-4.031	3.959-4.042	3.940-4.062
4.5	4.490-4.510	4.486-4.514	4.480-4.520	4.473-4.528	4.460-4.541	4.446-4.556	4.421-4.582
5	4.987-5.013	4.982-5.018	4.974-5.026	4.965-5.036	4.949-5.052	4.930-5.072	4.900-5.105
6	5.981-6.020	5.973-6.027	5.961-6.039	5.947-6.054	5.923-6.079	5.895-6.109	5.848-6.161
8	7.963-8.037	7.949-8.052	7.927-8.075	7.900-8.103	7.855-8.151	7.802-8.209	7.716-8.308
10	9.94-10.06	9.92-10.09	9.88-10.12	9.84-10.17	9.77-10.25	9.68-10.34	9.54-10.51
15	14.86-15.14	14.81-15.20	14.72-15.29	14.62-15.40	14.46-15.59	14.26-15.82	13.95-16.23
30	29.42-30.61	29.19-30.86	28.86-31.24	28.45-31.73	27.80-32.59	27.06-33.68	25.91-35.67
∞	1447-∞	1033-∞	723-∞	526-∞	362-∞	263-∞	181-∞

**f = 210.00**

m	40	5.6	8.0	11.0	16.0	22.0	32.0
0.8	0.799-0.801	0.799-0.801	0.798-0.802	0.798-0.802	0.797-0.803	0.796-0.804	0.794-0.806
0.9	0.899-0.901	0.898-0.902	0.898-0.902	0.897-0.903	0.896-0.904	0.894-0.906	0.891-0.909
1	0.999-1.001	0.998-1.002	0.997-1.003	0.996-1.004	0.994-1.006	0.992-1.008	0.989-1.011
1.1	1.098-1.102	1.097-1.103	1.096-1.104	1.095-1.105	1.093-1.107	1.090-1.110	1.086-1.115
1.2	1.198-1.202	1.197-1.203	1.196-1.204	1.194-1.206	1.191-1.209	1.188-1.212	1.183-1.218
1.3	1.297-1.303	1.296-1.304	1.295-1.305	1.293-1.307	1.289-1.311	1.285-1.315	1.279-1.322
1.5	1.496-1.504	1.495-1.505	1.492-1.508	1.490-1.510	1.485-1.515	1.480-1.521	1.471-1.531
1.7	1.695-1.705	1.693-1.707	1.690-1.710	1.686-1.714	1.680-1.720	1.673-1.728	1.661-1.741
2	1.993-2.007	1.990-2.010	1.986-2.015	1.980-2.020	1.971-2.030	1.961-2.041	1.944-2.060
2.5	2.488-2.512	2.483-2.517	2.476-2.524	2.468-2.533	2.453-2.549	2.436-2.567	2.409-2.599
3	2.982-3.018	2.976-3.025	2.965-3.036	2.952-3.049	2.931-3.072	2.906-3.101	2.866-3.149
5	4.95-5.05	4.93-5.07	4.90-5.11	4.86-5.15	4.80-5.22	4.73-5.30	4.62-5.46
10	9.79-10.22	9.71-10.31	9.58-10.46	9.44-10.64	9.20-10.95	8.94-11.36	8.52-12.11
∞	441-∞	315-∞	221-∞	160-∞	110-∞	80.2-∞	55.1-∞



# Vivitar®

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